

as "bar stock" valves. Bar stock valve bodies are particularly amenable to production on high speed automatic machines and therefore offer economies in manufacture not enjoyed by manufacturers of cast and forged valves.

Traditional bar stock valve bodies place the flow passage substantially along the central axis of the bar. The starting bar size is based on the resulting wall thickness, following machining, necessary to withstand the operating pressures the valve is exposed to in service. Choice of end connection also plays a role in sizing initial bar stock size. The bar size used, however, often is overly sufficient for the wall thickness requirements of the valve.

This over-design of the valve body frequently results from the need to provide adequate valve stem bearing support and adequate space for stem seals. To accommodate these items, the valve designer often selects a larger bar size, resulting in increased overall weight and cost of the valve body. Due to the manufacturing techniques used, it is inefficient to place the additionally required material locally in the valve body only where needed. Wherein the eccentrically located bore permits the standard size valve stem to be used with a resulting thinner barstock wall thickness on the valve body opposite the valve stem.

The present invention provides barstock body valves having the size and weight reduction achievable through eccentric (or off-center) machining of the barstock to create the valve body's flow passage. An eccentrically located flow passage results in a thinner wall adjacent to the flow passage, and an initially smaller barstock size.

A rejection under 35 U.S.C. § 102 is only appropriate if each and every feature of the rejected claims is expressly disclosed or taught in a single prior art document. Rawstron '032 does not disclose or in any way suggest a control valve constructed from barstock or the use of a flow port located eccentrically in the barstock to increase the available barstock thickness at one outer wall location and decrease the barstock thickness at the opposite wall. Thus the application of 35 U.S.C. § 102 to claims 1, 2 and 5 is improper and should be withdrawn.

Claim 3 is dependent on claim 1 and, therefore, incorporates all of the features of claim 1 and thus for the reasons set forth above is not taught by Rawstron '032. With respect,

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the features of claim 3 are also not rendered obvious by Rawstron '032 which contains no suggestion or indication that the teaching and disclosure thereof would be considered by a man skilled in the art as applicable to solving the problems solved by the inventor of the present invention with respect to providing a valve using barstock as its body without the previous weight and cost penalties attendant such a construction.

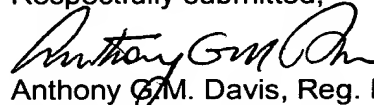
For the above reasons, all claims are now believed allowable and that allowance is respectfully requested.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



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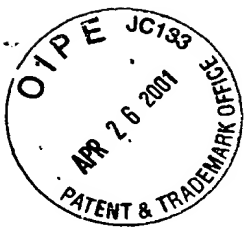
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Brief Description of the Drawings

The invention will now be described, by way of example, with reference to the accompanying drawings in which:

5 Fig. 1 indicates a sectioned elevation view of a typical valve assembly incorporating the invention, containing a body, a flow control ball, valve stem, stem tab, stem seal, flow ports, valve seats and handle and an eccentrically located flow bore centerline;

Fig. 1a indicates a sectioned elevation view of a valve as in Fig. 1 incorporating the invention, but with a third port provided within the body;

10 Fig. 2 indicates an end section view of a two port barstock valve body, centrally bored, incorporating a valve stem length limited to a central bore, the dashed line indicating possible barstock starting size reduction resulting from an eccentrically bored flow port;

15 Fig. 3 indicates the reaction load locations resulting from a side load applied by a valve handle to a stem at the valve handle location;

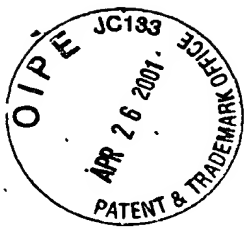
Fig. 4 indicates the reaction load locations resulting from a side load applied to a stem of increased length from the stem depicted in Fig. 3;

20 Fig. 5 indicates an end section view of the general increased barstock size required to incorporate a longer stem than shown in Fig. 2, if a central flow bore is retained, the dashed line indicating the net smaller barstock size of Fig. 2;

25 Fig. 6 indicates an end section view of the invention eccentrically bored flow port providing for an increased length stem, the dashed line indicating approximate barstock size savings compared to the centrally bored flow port of Fig. 5;

Fig. 7 indicates an end section view of the typical barstock size increase necessary to incorporate a third flow port, utilizing a centrally bored through flow port, and noting the extended stem length required to reach the centrally bored flow port; ~~and~~

30 Fig. 8 indicates an end section view of a reduced barstock size achievable by the invention eccentrically bored main flow port, a third flow



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port sized as shown Fig. 7, and the Fig. 6 increased stem length, the dashed line indicating the approximate barstock size reduction achievable through eccentric flow port boring compared to the Fig. 7 relatively larger barstock size, and

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Fig. 9 provides a flow diagram for the method of the present invention.

Description of the Preferred Embodiments

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Turning first to Fig. 1, a cross-sectional view of a quarter-turn ball valve assembly is shown. The assembly 1 has a valve stem 4 with stem seal 6 installed in valve body 2 with integral valve stem tab 5 engaging a flow control ball 3. The valve stem 4 may be rotated by handle 10 by means of a mating shaped hole, having hole flats that bear on valve stem flats.

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In operation handle 10 is rotated to turn ball 3 into position to permit fluid flow between port 7 and port 8. Rotating the stem back to its original position prevents flow between the two ports. Valve seats 9 prevent leakage between the ball 3 and body 2.

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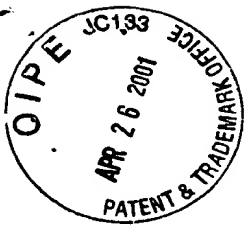
Also according to the invention, the throughbore centerline 12 is eccentrically located off the barstock centerline 11, such that, in Fig. 1 configuration of the invention, valve body 2 wall thickness is greater adjacent to the valve stem 4 side of the throughbore centerline 12. This increased wall thickness permits use of a longer stem which serves to diminish the magnitude of reaction forces applied to stem seal 6 in response to eccentric loading of stem 4.

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Turning to Fig. 1a, a cross-sectional view of a three-port quarter-turn rotary ball valve assembly is shown. Such an assembly is, in general, a substantially standard barstock valve. The assembly 1 has a valve stem 16 with stem seal 18 installed in valve body 14 with an integral valve stem tab 17 engaging a flow control ball 15. The valve stem 16 may be rotated by handle 22 by means of a mating shaped hole, having hole flats that bear on valve stem flats.

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In operation, handle 22 is rotated to turn ball 15 into position to permit fluid flow between port 19 or port 20 via passage 26 and outlet port 25.



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incorporating the same bottom port 45 of Fig. 7, without the unnecessary length of stem 51 of Fig. 7, but retaining the improved length stem 40 of the single port valve depicted in Fig. 6.

5 As shown in the flow diagram of Fig. 9, the method of reducing
initial barstock size in a barstock body fluid control valve of the
present invention comprises the steps of cutting barstock of
predetermined size, outer wall configuration and material to length;
forming a valve body by machining flat surfaced ends on said barstock
perpendicular to said barstock outer wall; aligning to longitudinally
10 bore said barstock along a centerline eccentrically located to position
bore closer to said barstock outer wall; machining a throughbore in
said barstock along said eccentric centerline; machining a valve stem
bore perpendicular to said throughbore, positioning said valve stem
bore a maximum distance from eccentric centerline; installing a
15 standard size valve stem; wherein the eccentrically located bore
permits the standard size valve stem to be used with a resulting
thinner barstock wall thickness on the valve body opposite the valve
stem.